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File: USPT

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DOCUMENT-IDENTIFIER: US 6797859 B2

TITLE: Vascular tissue preferred promoters

Brief Summary Text (9):

There may also be a use for a vascular tissue-preferred promoter in improvement of stalk strength. For example, via cell wall thickening such as by deposition of more cellulose. A vascular tissue-preferred promoter is desirable to use for expressing genes that are involved in cellulose biosynthesis in order to increase cell wall strength. When cell wall strength is increased in corn stalk, better standability is expected. This is particularly relevant to improving resistance to stalk lodging in corn. An example of such application is to use a vascular tissue-specific promoter to drive a cellulose synthase gene that is involved in secondary cell wall formation, such as the *irx3* gene from *Arabidopsis thaliana* (Taylor N G, Scheible W R, Cutler S, Somerville C R, Turner S R. 1999. The irregular xylem3 locus of *Arabidopsis* encodes a cellulose synthase required for secondary cell wall synthesis. *Plant Cell* 11:769-80). In this case, cells that do not normally have secondary wall would potentially gain additional cell wall growth, thus leading to a stronger cell structure.

Detailed Description Text (46):

Substances that regulate vascular tissue loading include, but are not limited to, sucrose transporters encoded by SUT1 (Genbank Accession Nos. AF280050, AJ272309, AF167417, AF191025, AF191024, AF109922, X82275, AJ224961, X83850, X69165), SUT2 (Genbank Accession Nos. Y16768, AF166498, AJ272308) and SUT4 (Genbank Accession Nos. AF176950, AF175322, AF237780); sucrose synthases encoded by ASUS1 (Genbank Accession No. X70990), SUC1 (Genbank Accession No. X75365), SUC2 (Genbank Accession Nos. X75764, X79702), SUS1 (Genbank Accession No. L29418), Shrunken1 (Genbank Accession No. J01241), SS1 (Genbank Accession No. AJ001117) and SS2 (Marana et al. (1988) *Gene* 63:253-260); amino acid transporters encoded by NaAAP1 (Genbank Accession No. AF080542); peptide transporters encoded by NaAAP1 (Schultz, et al. (1999) *Plant J.* 6:637-646), galactinol synthases (Genbank Accession Nos. AF249912, AJ237693, AJ237694), inorganic pyrophosphatases (Genbank Accession No. AJ252210), K<sup>+</sup> channel proteins encoded by AKT3 (Genbank Accession No. U44745), H<sup>+</sup> ATPases encoded by AHA1 (Genbank Accession No. AJ002020), AHA2 (Harper et al. (1990) *J. Biol. Chem.* 265:13601-13608), AHA3 (DeWitt et al. (1991) *Plant J* 1:121-128), and pma4 (Gianinazzi-Pearson et al. (2000) *Planta* 211:609-613 and Genbank Accession No. X66737), amino acid permeases (Genbank Accession No. X71787), phloem carbohydrate regulators encoded by pgm (Genbank Accession No. AF216580) and *sex1* (Genbank Accession No. AF312027), and fructosyltransferases genes (e.g Genbank Accession No. AJ250634). Each of these references, including those identified by their Genbank Accession Nos., is herein incorporated by reference.

Detailed Description Text (64):

The quality of grain is reflected in traits such as levels and types of oils, saturated and unsaturated, quality and quantity of essential amino acids, and levels of cellulose. In corn, modified hordothionin proteins, described in U.S. patent application Ser. No. 08/838,763, filed Apr. 10, 1997; Ser. No. 08/824,379, filed Mar. 26, 1997; Ser. No. 08/824,382, filed Mar. 26, 1997; and U.S. Pat. No. 5,703,049 issued Dec. 30, 1997, provide descriptions of modifications of proteins for desired purposes.